PLEIADES

NASA's Pleiades supercomputer is currently ranked seventh on the Top500 list of the world's most powerful supercomputers.

• System Architecture:
  – SGI Altix ICE consisting of 11,776 dual-socket nodes
  – Intel quad- and hex-core Xeon processors (Nehalem, Harpertown and Westmere)
  – Total cores: 112,540
  – Total memory: 188 terabytes

• Peak performance of 1.33 petaflops
  – LINPACK rating: 1.09 petaflops (June 2011, using 11,648 nodes)

• New cluster with 64 graphics processing unit (GPU)-enhanced nodes: 50 teraflops

• Features the world's largest InfiniBand interconnect network, with more than 65 miles of double and quad data rate cabling

• Serves as a major computational resource for all NASA mission directorates: aeronautics research, exploration systems, science, and space operations

• Central component of an integrated environment providing users with mass storage, high-speed networking, modeling and simulation, data analysis and visualization, application performance optimization, and advanced user services

Among the scientific and engineering projects running on Pleiades:

• High-resolution global models that yield more accurate hurricane predictions—tropical cyclones can now be realistically predicted up to 5 days in advance

• High-fidelity analyses of every Space Shuttle launch to assess debris damage, make repair decisions, and clear vehicles for safe landing

• Unprecedented cosmological simulations of galaxy formation that help to better understand how spiral and elliptical galaxies are created

• Computational fluid dynamics simulations of complex aircraft, to improve vehicle performance, diminish noise, and reduce environmental impact

• Extensive simulations of complex aerodynamic properties for design of future space vehicles

Pleiades has been operational since November 2008.